SONY

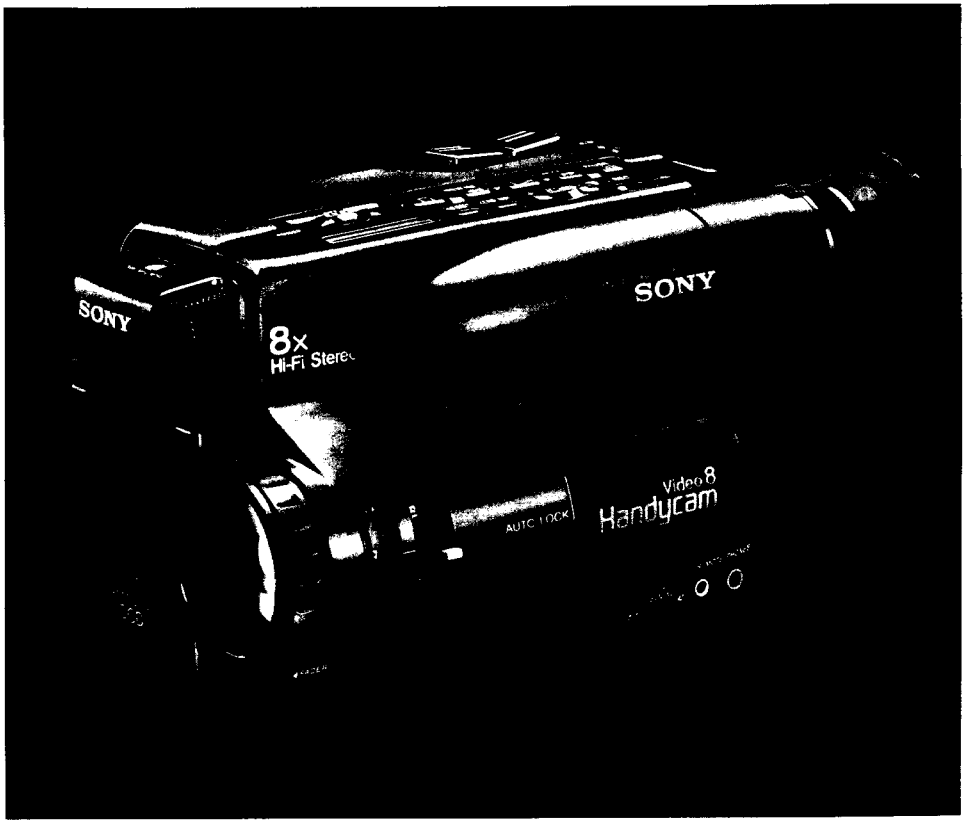
3-751-908-22 (2)

Video Camera Recorder 8

CCD-TR7

Operating Instructions

Before operating the unit, please read this manual thoroughly and retain it for future reference.



Video 8 Handycam

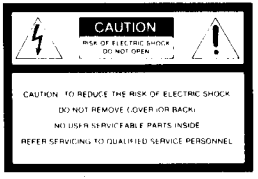
Owner's Record

The model number and serial numbers are located on the bottom. Record the serial number in the space provided below. Refer to these numbers whenever you call upon your Sony dealer regarding this product.

Model No. CCD-TR7 Serial No. _____

WARNING

To prevent fire or shock hazard, do not expose the unit to rain or moisture.


CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN
CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK
DO NOT REMOVE COVER (OR BACK)
NO USER-SERVICEABLE PARTS INSIDE
REFER SERVICING TO QUALIFIED SERVICE PERSONNEL

This symbol is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

This symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

INFORMATION for the customers in the U.S.A.

This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient the receiving antenna
Relocate the equipment with respect to the receiver
Move the equipment away from the receiver
Plug the equipment into a different outlet so that equipment and receiver are on different branch circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful:

"How to Identify and Resolve Radio-TV Interference Problems".

This booklet is available from the U.S. Government Printing Office, Washington, DC 20402, Stock No. 004-000-00345-4.

For the customers in Canada

This apparatus complies with the Class B limits for radio noise emissions set out in Radio Interference Regulations.

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Introduction

Overview of the CCD-TR7

The CCD-TR7 Video 8 Handycam is a compact color video camera/recorder (camcorder).
You can use it to shoot the pictures you want and play them back on your television set. It is equipped with a Hi-Fi stereo recording system which offers high quality sound.
The camcorder uses 8mm video-format cassettes.

Who This Manual is for

This manual is for you. You can use this manual to find exactly the information you need, whether you are familiar with video equipment or not.

How the Manual is Organized

The first section of the manual explains the preliminary steps necessary to prepare for shooting and playing back.

Other sections include shooting procedures that show you how to use the various features and functions of your camcorder. If you are beginner, start with "Recording with automatic adjustments." If you are very familiar with camcorders, try to shoot your picture with manual adjustments as well as automatic adjustments.
If you want to record right away, see p.25 through 26.

The manual also includes information on how to play back a picture on a TV and how to edit your original 8mm tape onto another video tape.

If you have any problems during operation, see the "Trouble Check" section.

How This Manual Works

Use the information below to help you follow the instructions in this manual.

- Controls and settings on the camcorder are shown in capital letters:
  ex. Set POWER to CAMERA.
- The letter in an illustration corresponds to the letter in the text:
  ex. (A-1) or [a]
- The step numbers in all illustrations correspond to the step numbers in the text.
- Notes and caution messages are set off with lines.
  ex.
  Note on battery life
  Battery will not last as long in cold places.

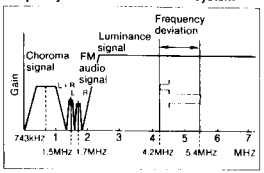
Supplied Accessories

The camcorder is packed together with the following units. Check to see that everything is contained in the package.
(*Attached to the camcorder)

- Battery pack NP-55 (1)
- AC power adaptor AC-V30 (1)
- Lithium battery CR2025 (1)
- RFU adaptor RFU-90UC (1)
- Step-up-ring ø37mm → ø46mm (1)
- Shoulder strap (1)
- Jack cover (1)*
- Lens cap (1)*
- AV cable (1)
- Handy Manual (1)

(A-1)

Frequency allocation of the hi-fi system



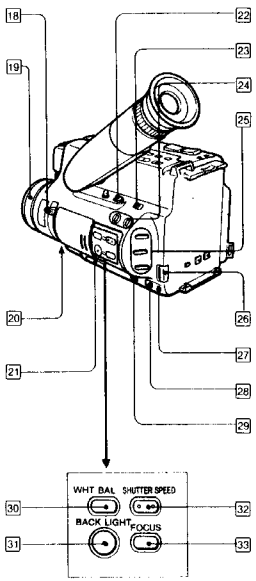
Hi-Fi Stereo System

On the 8mm video standard track the sound is recorded/played back in hi-fi monaural. On this camcorder, an additional hi-fi stereo sound can be recorded on the standard track.
The hi-fi stereo sound is recorded as L + R on the 1.5 MHz carrier and L − R on the 1.7 MHz carrier in FM as illustrated. **(A-1)** This method was adopted to maintain compatibility with the conventional hi-fi monaural sound.
When playing back the tape recorded in this hi-fi stereo system, a matrix circuit is used to produce the L and R stereo sounds separately. When a conventional hi-fi monaural model is used to play back a tape recorded by this camcorder in hi-fi stereo, the playback sound will be in a L + R monaural sound. This is because the monaural models will play back only the sound recorded in the 1.5 MHz carrier. The hi-fi stereo system of this camcorder enables you to enjoy a live stereo sound atmosphere.

Compatibility with the conventional 8 mm video format

When you playback a tape recorded in stereo hi-fi on a conventional 8 mm video equipment, the sound will be in monaural.

(B-3)



(B-3)

18 **Zoom lever ●, ●**
Macro set button ●

19 **Focus ring ●**

20 **FADER button ●**

21 **Lithium battery compartment ●**

22 **REC start/stop button ●**
Use when recording in the low position.

23 **EDIT switch ●**
Normally set to the left position. When editing tapes, set to EDIT.

24 **DATE and TIME buttons**
Press to display or turn off the date or time.

25 **Superimpose buttons ●**
MEMORY button
COLOR/MODE button
SUPERIMPOSE button

26 **BATT (Battery eject) knob ●**

27 **PHONES (Headphones) jack (stereo mini-jack)**

28 **REMOTE control jack (stereo mini-mini-jack)**
Connect a wired remote control unit, an editing controller, or other equipment here.

29 **HI-FI SOUND switch ●**
Set to the appropriate position when playing back the tape.

30 **WHT BAL (white balance) button ●**

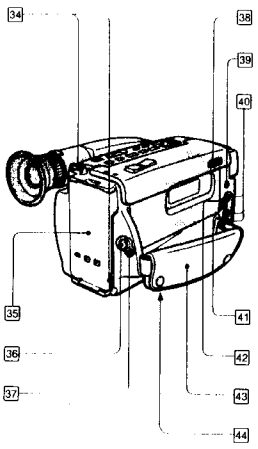
31 **BACK LIGHT button ●**

32 **SHUTTER SPEED button ●**
Used to select the shutter speed.

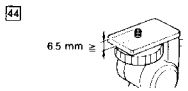
33 **FOCUS button**
Used for manual focusing.

About (LANC)
stands for Local Application Control Bus System. The connector is used for controlling the tape transport of video equipment and the peripherals connected to it. This connector has the same function as the connectors indicated as CONTROL L or REMOTE.

(B-4)



(B-5)



(B-4)

34 **Hooks for shoulder strap**
Attach the shoulder strap.

35 **Battery mounting surface**

36 **START/STOP button**
Press to start and stop camera recording.

37 **STANDBY switch**
Slide up to set the camcorder to the standby mode.

38 **Lid lock**
Slide to the left to open the cover.

39 **MIC jack (PLUG IN POWER) (stereo minijack)**
Connect an external stereo microphone.

40 **VIDEO/AUDIO jacks (phono jacks)**

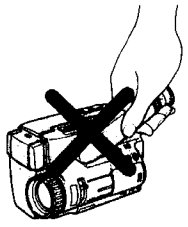
41 **DC OUT (RFU adaptor DC output) jack (special minijack)**
Attach the supplied RFU adaptor here if necessary. This jack also supplies power to an external microphone.

42 **VIDEO/AUDIO INPUT/OUTPUT selector switch**
For input: Slide to INPUT
For output: Slide to OUTPUT

43 **Grip strap**
Adjust the length so that your thumb can easily manipulate the START/STOP button.

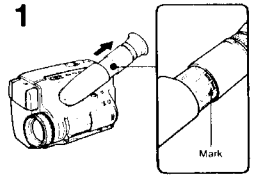
44 **Tripod receptacle**
Note that when you are attaching a tripod not manufactured by Sony, the length of the camera mounting screw must be less than 6.5mm. Otherwise the screw may damage the inner parts of the camera.
(B-5)

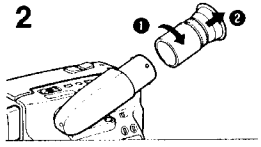
(B-6)

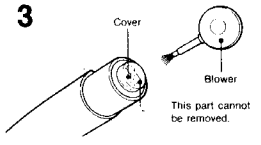


Caution (B-6)
Do not pick up the unit as shown in the illustration.

(B-7)







To Perform

To remove dust from inside the viewfinder (B-7)

1 **Pull out until the mark appears.**

2 **Turn counterclockwise until it stops and pull out.**

3 **Clean the surface of the cover with a blower.**

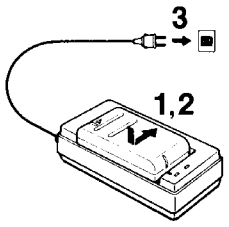
First, Choose the Power Source.

Place	Power source	Accessory to be used
Outdoors	Battery pack	Battery pack NP-55 (supplied), NP-66H, NP-77, NP-77H
	Alkaline batteries	Battery case EBP-55
Indoors	House current	AC power adaptor AC-V30 (supplied), AC-V55
In the car	12V or 24V car battery	DC pack DCP-77, DCP-55 (DCC-16B car battery cord supplied)

Note on power source

- Disconnecting the power source or removing the battery pack during recording or playback may damage the inserted tape. If disconnected accidently supply the power again immediately.

(C-1)



Using the Battery Pack

Step 1

Charge the battery pack. (C-1)

1 **Align the right side of the battery pack with the line on the AC power adaptor.**

2 **Slide in the battery pack to the right.**

3 **Connect the AC power adaptor to a wall outlet.**

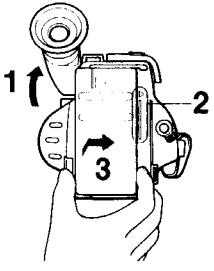
Approximate required charging time (minutes) when using AC-V30

NP-55*	NP-66H	NP-77	NP-77H
60	110	120	140

* Supplied

See the instruction manual of the AC power adaptor for details.

(C-2)



Step 2

Mount the battery pack on the camcorder. (C-2)

1 **Lift up the viewfinder.**

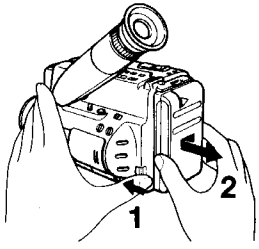
2 **Align the right side of the battery pack with the line on the camcorder.**

3 **Slide the battery pack to the right.**

Note

Make sure the battery fits completely on the mounting surface of the camcorder. Imperfect fit may damage the projections on the camcorder.

(C-3)



To remove the battery pack (C-3)

While pressing the BATT knob in the direction of arrow, slide to the left and pull out the battery pack as illustrated.

Battery life

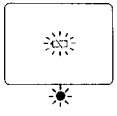
A fully charged battery pack lasts for:

NP-55*	NP-66H	NP-77	NP-77H
60	110	120	150

(Approx. minutes, continuous recording when used indoors)

* Supplied

(C-4)



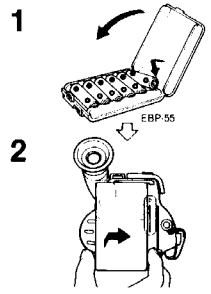
When the battery becomes weak (C-4)

The ⌧ indication and red lamp blink slowly in the viewfinder. Replace the battery pack with a fully charged one when they blink rapidly.

Other options for charging

- AC-V55 AC power adaptor: You can charge two battery packs one after another.
- BC-55, BC-77 portable battery charger: You can charge a battery pack on 100-240 V AC.
- DC-V30 car battery charger: You can charge a battery by connecting the car battery charger to the cigarette lighter socket. This battery charger can also supply power for Sony 8 mm equipment that operates on a battery pack.
- NP-4000 rechargeable battery pack: You can use it for long outdoor recording.

(C-5)



Using Alkaline Batteries

(C-5)

The EBP-55 battery case is required (not supplied.)

1 Insert 6 AA size alkaline batteries into the battery case.

2 Attach the case in the same way as the battery pack.

Battery life
Approx. 60 minutes using Sony alkaline batteries (continuous recording when operated indoors)

Notes on battery life
- Batteries will not last as long in cold places.
- No indication appears in the viewfinder when the batteries are weak.

Using House Current

(C-6)

Use the supplied AC-V30 AC power adaptor.

1 Insert the connecting cord supplied with the AC-V30 AC power adaptor into the DC OUT jack on the AC power adaptor.

2 Lift up the viewfinder.

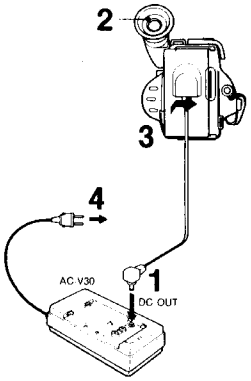
3 Align the right side of the connecting plate with the line on the camcorder, and slide it in to the right.

4 Connect the AC power adaptor to a wall outlet.

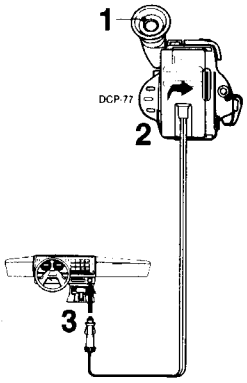
We recommend the use of the AC power adaptor while viewing the playback picture on the TV, editing tapes or recording a TV program, as you do not need to worry about running out of power.
See the instruction manual of the AC power adaptor for details.

Other options
The AC-V55 AC power adaptor can also be used.

(C-6)



(C-7)



Using Car Battery

(C-7)

The DCP-77 DC pack is required (not supplied).

1 Lift up the viewfinder.

2 Align the right side of the DC pack with the line on the camcorder, and slide it in to the right.

3 Connect the cord to the cigarette lighter socket of a car (12V or 24V).

To remove the DC pack
While pressing the BATT knob on the camcorder, slide the DC pack to the left and pull out.

Other options
- The AC-V55 AC power adaptor and the DCC-16AW car battery cord can also be used to operate this camcorder on a 12V or 24V car battery.
- DCP-55 DC pack can also be used to operate this camcorder on a 12V or 24V car battery.

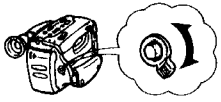
Getting the Most from the Battery Pack

How to Prepare the Rechargeable Battery Pack

Have sufficient battery pack power to do 2 or 3 times as much recording than you have planned.
"Battery life" as indicated in the instruction manual or catalogue of the camcorder is measured by the continuous recording time of the camcorder, placed at a room temperature using a full-charged battery.

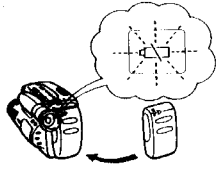
Battery life is shorter in a cold climate
Battery efficiency is decreased and the battery will be used up more quickly.

Leaving the unit in the standby mode will consume power and shorten the available battery life. To conserve power, turn the STANDBY switch off between recordings. A smooth transition between scenes can be made even if recording is stopped and started again.
While positioning the subject or selecting an angle, by viewing through the viewfinder, and in using autofocus, the battery is being expended. The battery is also being expended when a tape is inserted or removed.



When the Rechargeable Battery Pack should be Replaced

When the ⌧ mark in the viewfinder changes from slow blinking to rapid blinking while you are recording,
Turn off the power switch of the camcorder and replace the battery pack. Leave the tape in the camcorder in order to obtain a smooth recording after the battery pack is replaced.



Notes on Charging

Before using the battery pack, charge it sufficiently. A brand-new battery pack is not charged.

Recharge the battery pack only when it is exhausted.
- If recording is completed before the mark ⌧ appears in the viewfinder, it is recommended that you remove the tape, set POWER to CAMERA, slide up the STANDBY, and leave the camcorder until the ⌧ mark blinks rapidly.
- Repeated charging while some capacity remains causes a lowering of battery capacity. However, the original battery capacity can be recovered if you fully charge and discharge the battery again.

Recharge the battery pack before using.
If the battery pack is charged fully but not used for a long time (about 1 year), it becomes discharged. Charge it again but in this case the battery life will be shortened than normal. After several charging and discharging cycles, the battery life will recover its original capacity

Keep the Terminals Clean

If the terminals (metal parts on the back) are not clean, the battery duration will be shortened.
When the terminals are not clean or when the battery pack has not been used for a long time, install and remove the battery pack from time to time. This will improve the contact condition. Also, wipe the + and − terminals with a soft cloth or paper.

Notes on the Rechargeable Battery Pack

Why the battery pack heats up
During charging or recording, the battery pack heats up. This means energy has been generated and chemical change has occurred inside the battery pack and this is not dangerous.

How to care for the battery pack
- Remove the battery pack from the camcorder after using it, and keep it in a cool place. When the battery pack is attached to the camcorder, a small amount of current flows to the camcorder even if the POWER switch is turned off. It causes overdischarging and shortens battery life.
- The battery pack is always discharging even when it is not in use after charging. Thus it is recommended you charge the battery before using.

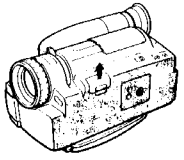
How to use the switch on the battery pack
This switch is provided so that you can remember the charging condition. Set the switch to the "no mark" position when charging is completed. Set the switch to the "red mark" position when the battery is used up.

How many times can the battery pack be recharged
It can be fully charged and discharged about 500 times under normal temperatures. If the ⌧ mark blinks rapidly just after turning on the camcorder with a fully charged battery pack, the battery pack should be replaced with a new fully charged one.

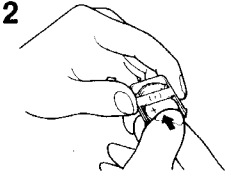
Temperatures during charging
Lower temperatures require a longer charging time. Charging under temperatures ranging from 10°C to 30°C is recommended.

(D-1)

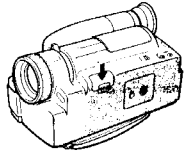
1



2



3



Setting the Date and Time

Inserting the Lithium Battery

(D-1)

This camcorder uses a lithium battery to activate the clock and to keep titles in memory. Before operating it for the first time, install the supplied lithium battery.

1 Pull out the lithium battery holder from the bottom of the camcorder.

2 Install the supplied CR2025 lithium battery with the + side facing the (+) on the battery holder.

3 Put the lithium battery holder back into the camcorder.

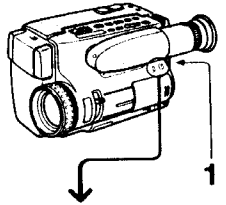
To change the lithium battery
Remove the lithium battery holder from the camcorder, and pull out the lithium battery and insert a new one.

Note on battery life
The battery lasts for approximately 1 year under normal operation. When the lithium battery becomes weak, the time indication keeps blinking in the display window and blinks in the viewfinder for about 5 seconds when the POWER switch is set to CAMERA. When this happens, replace the battery with a Sony CR2025 or Duracell DL-2025 lithium battery. Use of another battery may present a risk of fire or explosion. While replacing the lithium battery, keep the battery pack or other power source attached. If the battery pack or other power source was not attached while replacing, readjustment of the date and time is necessary.

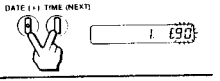
Cautions
- Keep the lithium battery out of the reach of children.
  Should the battery be swallowed, consult a doctor immediately.
- Wipe the battery with a dry cloth to assure good contact.
- Be sure to install the battery with the correct polarity.
- Do not hold the battery with metallic tweezers, as a short-circuit may occur.

WARNING
Battery may explode if mistreated. Do not recharge, disassemble, or dispose of in a fire.

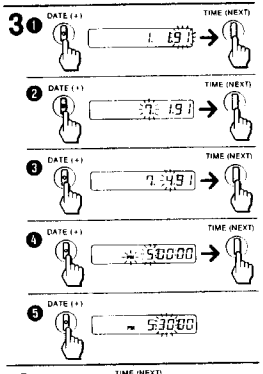
(D-2)



2



3



4

Setting the Date and Time

(D-2)

1 Make sure that a power source is connected, set POWER to CAMERA, and slide STANDBY up.

2 Press DATE and TIME simultaneously for more than 3 seconds until the date indication appears in the display window. DATE now functions as + (to advance numbers) and TIME functions as NEXT (to execute).

3 Set the year, month, day, hour and minute, in this order.
First adjust the blinking digits with + and then press NEXT.

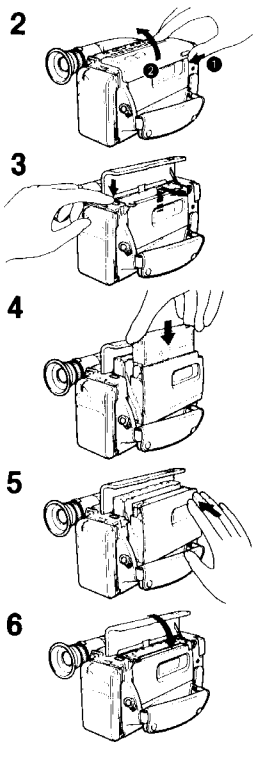
4 Press NEXT to set the second. The clock starts operating.

To correct the date and time setting
Repeat steps 2 to 4.

To advance the digits faster
Keep + pressed.

To check the preset date and time
Press DATE or TIME. When you press the same button again, the indication goes off.

(E-1)



Inserting a Tape

(E-1)

1 **Make sure a power source is connected.**

2 **While sliding the lid lock in the direction of the arrow lift up the lid until it clicks.**

3 **Press EJECT.**
The lip of the cassette compartment will automatically lift up and open.

4 **Insert the cassette with the window facing out.**

5 **Press the PUSH mark on the cassette compartment cover to close it.**

6 **Close the lid.**

Ejecting the Tape

1 **Make sure that a power source is connected.**

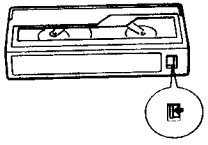
2 **While sliding the lid lock in the direction of the arrow, lift the lid up until it clicks.**

3 **Press the EJECT.**
The lip of the cassette compartment will lift up and automatically open.

4 **Take out the cassette and press the PUSH mark on the comparment to close it.**

5 **Close the lid.**

(E-2)



Preventing Accidental Erasure

(E-2)

Slide out the red tab on the cassette to protect the recording.
To re-record on this tape, slide the tab back in.

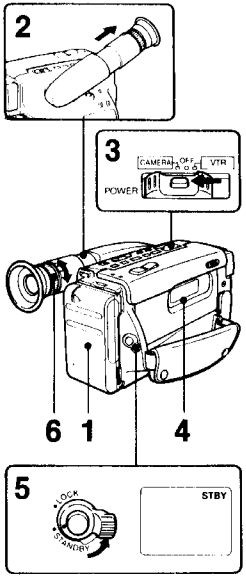
Notes on handling tapes

- Never insert anything in the small holes on the rear of the cassette. These holes are used to sense the type of tape, thickness of tape, or if the tab is out or in, etc.
- Store tapes in their cases and keep them in an upright position to prevent intrusion of dust and uneven winding.

Adjusting the Viewfinder Lens

The position of the viewfinder lens for optimum vision varies depending on the person. Adjust when using the first time, or when using after someone else.

(F-1)



1 **Make sure a power source is connected.**

2 **Pull the viewfinder out until it clicks.**

3 **While pressing the green button, set POWER to CAMERA.**

4 **Insert a cassette.**

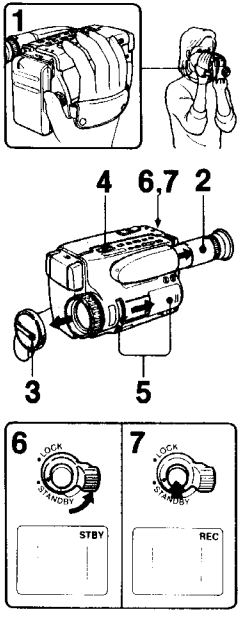
5 **Slide STANDBY up.**

6 **Turn the viewfinder lens adjustment ring so that the "STBY" display in the viewfinder screen comes into sharp focus.**

Recording a Picture Using Automatic Adjustments

Before recording "once-only" events, we strongly recommend making a trial recording and checking that everything is working properly.

(F-2)



1 **Hold the camcorder as illustrated.**
Put your hand through the grip strap and check that your thumb can easily touch START/STOP.

2 **Make sure that the viewfinder is pulled out.**

3 **Remove the lens cap and clip it on the grip strap.**

4 **While pressing the green button, set the POWER to CAMERA.**

5 **Close the AUTO LOCK cover and turn the zoom lever downwards.**

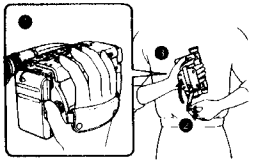
6 **Slide STANDBY up.**
"STBY" and the auto-focus frame appear in the viewfinder. The camcorder is now in the standby mode, and focus is adjusted automatically inside the frame (auto-focus adjusting range). Do not turn or stop the focus ring forcibly.

7 **Press START/STOP.**
"REC" appears and the red lamp lights up in the viewfinder. The camcorder is now recording.

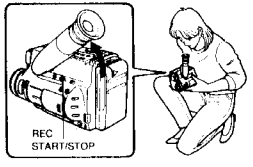
To pause (to stop momentarily)
Press START/STOP again.
"STBY" appears in the viewfinder. The camcorder is in the standby mode again.

To stop
Slide STANDBY down and set POWER to OFF.

(F-3)



(F-4)



Recording a Picture Using Automatic Adjustments

How to fit the grip strap

(F-3)

In step 1 on the previous page, hold the camcorder against your body and pull the grip strap upward.

For low-position recording

(F-4)

The viewfinder can be turned 90 degrees up. It can be used in either the pushed-down or pulled-out position.

1 Slide STANDBY up.

2 Press REC START/STOP with your left thumb.

Notes on recording

- To record from the beginning of the tape, run the tape for about 15 seconds before recording. This will avoid missing the starting point when the tape is played back.
- If POWER is moved during recording, the tape will stop.
- When moving from indoors to outdoors, or vice versa, slide STANDBY up and point the camcorder at a white object for about 15 seconds so that the white balance is properly adjusted.

Note on the standby mode

If you leave the camcorder in the standby mode for 5 minutes or more, the camcorder will be turned off automatically. To resume the standby mode, slide STANDBY down once and slide it up again. To start recording, press START/STOP directly.

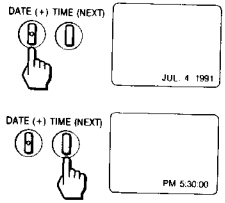
Recording mode

This camcorder records in the SP mode (approximately 1.43cm/second) and can play back in the SP and the LP modes (approximately 0.72cm/second). The quality of the playback picture in the LP mode, however, will not be as good as that in the SP mode.

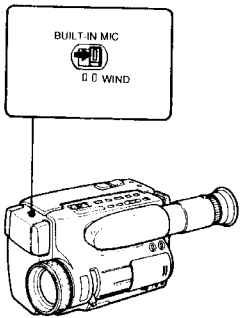
Note on PCM recording and playback

PCM recording or playback is not possible with this camcorder. The PCM sound recorded or after-recorded with another video recorder cannot be played back with this camcorder.

(F-5)



(F-6)



Recording a Picture Using Automatic Adjustments

To Record Date and Time

(F-5)

During camera recording or when in the recording pause mode, press DATE for date indication or TIME for time indication.
The date or time displayed in the viewfinder is recorded with the picture.

To stop recording date and time

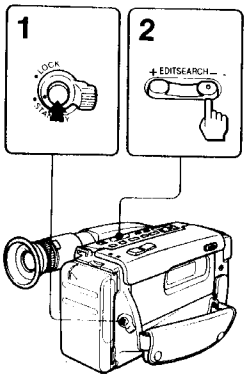
Press DATE or TIME again.
The picture recording continues.

When There is a Strong Wind

(F-6)

Set BUILT-IN MIC to "WIND."
The noise from the wind (bass noise) will be reduced.
After recording, set it to the green position (green mark).
If you forget to do this, sound may be recorded unnaturally because of this function.

(F-7)



Recording a Picture Using Automatic

To Check the Last Portion of the Previous Recording

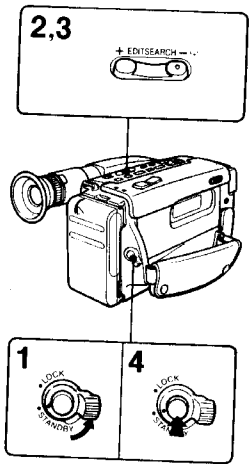
(F-7)

1 Set the camcorder in the recording pause mode by pressing START/STOP.

2 Press – side of EDITSEARCH (⏪) momentarily.
The last few seconds of the recorded portion are rewound and then the recorded picture appears in the viewfinder. After a few seconds of playback, the camcorder goes back to the recording pause mode.

If the picture has not been recorded
The video heads may be contaminated. Clean the heads using the Sony V8-25CLH video head cleaning cassette or equivalent.

(F-8)



Recording a Picture Using Automatic Adjustments

To Re-record a Previously Recorded Portion

(F-8)

1 Slide STANDBY up to set the camcorder to the standby mode.

2 Look in the viewfinder and find the point from where you want to begin the recording by :
Keeping the + side of EDITSEARCH pressed to advance the picture at the normal playback speed, or the – side to reverse the picture playback.

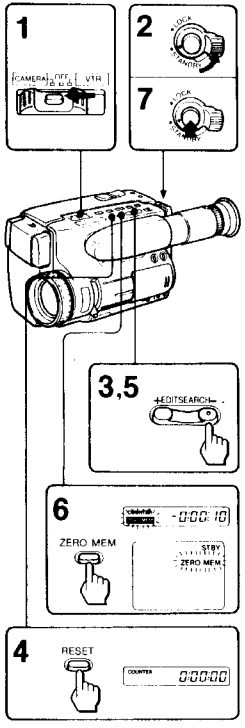
3 At the desired point, release EDITSEARCH.

4 Press START/STOP to start recording.

The picture is connected smoothly after the prerecorded portion even if STANDBY is slid down and up, or even if the power is turned off and on again, provided that the tape is not removed.

To stop
Slide STANDBY down.

(F-9)



To Re-record a Picture in the Middle of a Recorded Tape (Insert Recording)

(F-9)

1 **While pressing the green button, set POWER to CAMERA.**

2 **Slide STANDBY up to set the camcorder to the standby mode.**

3 **While looking in the viewfinder, keep pressing the + or – side of EDITSEARCH and release the button where you want to end the insertion.**
The camcorder is set to the standby mode again.

4 **Press RESET.**
The counter is reset to zero.

5 **While looking in the viewfinder, keep pressing the – side of EDITSEARCH and release the button at the point where you want to start the insertion.**

6 **Press ZERO MEM.**
The insert ending point is stored in memory.

7 **Press START/STOP.**
Insert recording begins, and stops automatically near the counter zero point.

To cancel ZERO MEM
Press ZERO MEM.

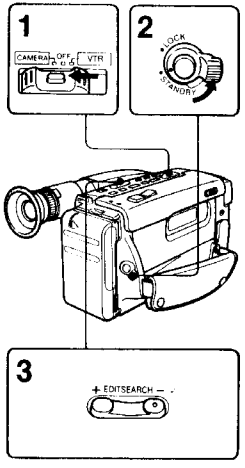
Note
The picture may be distorted at the end of the inserted portion when it is played back.

Recording a Picture Using Automatic Adjustments

Playing Back the Picture Instantly

(F-10)

(F-10)



You can check the recorded picture in the viewfinder. Sound is not heard.

1 **While pressing the green button, set POWER to CAMERA.**

2 **Slide STANDBY up.**

3 **Keep pressing the + or – side of EDITSEARCH to play back the picture.**
- **+ side:** to view the playback picture
- **– side:** to view the playback picture in reverse

To stop playback
Release EDITSEARCH.

To monitor the sound while viewing the playback picture in the viewfinder
Connect headphones to the PHONES jack.

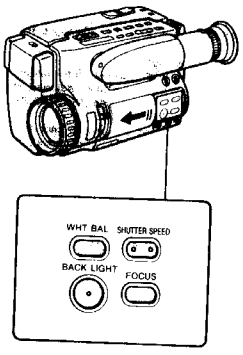
1 **While pressing the green button, set POWER to VTR.**

2 **Press ◀◀ to rewind the tape and press □ where you want to stop.**

3 **Press ▷ to start playback.**

Selecting the Automatic/Manual Adjustment

(G-1)



When you close the AUTO LOCK cover, the focus and white balance are adjusted automatically, and the shutter speed is set to 1/60.
The automatic function offers you worry-free operation under most shooting conditions. But under certain circumstances, manual adjustment is better for effective recording. For manual adjustment, open the AUTO LOCK cover and select an appropriate setting.

What Each Button Does

(G-1)

WHT BAL:
Press to lock the white balance in the ☀ (outdoors), ☆ (indoors), or HOLD mode. The tone of colors is fixed regardless of the lighting condition. (See page 36.)

SHUTTER SPEED:
Press to increase the shutter speed to record a fast-moving subject, such as a golf or tennis swing, clearly. (See page 38.)

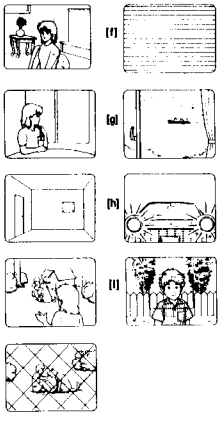
BACK LIGHT:
Press when a subject appears dark against a bright background. (See page 40.)

FOCUS:
Press to set the camcorder in the manual focusing mode.
Once the focus is adjusted manually, the setting is locked. (See page 34.)

Even if you open the AUTO LOCK cover
The setting of each button is the same as the automatic adjustment until you change it.

Notes
- Even when you set POWER to OFF, the previous settings are retained. They are cancelled if the power source is disconnected.
- If you close the AUTO LOCK cover after you have made manual adjustment and then open it again, the settings for manual adjustment will be recalled.

(H-1)



Manual Focusing

When you close the AUTO LOCK cover, the autofocusing functions and you can easily get a focused picture under most shooting conditions. But manual focusing is recommended in the following cases.

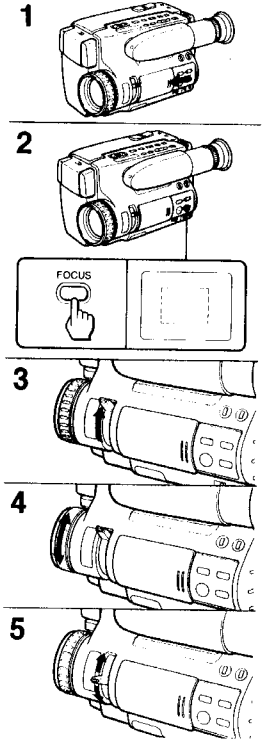
[a] to [i] correspond to the illustrations. **(H-1)**

[a] Insufficient light
[b] Too much brightness behind the subject
[c] Subject with little contrast—wall, sky, etc.
[d] One subject is close; the other is in the center, but at a distance
[e] Subjects beyond nets, etc., or another subject passes in front of the camcorder
[f] Horizontal stripes
[g] Subject through frosted glass
[h] Bright subject or subject reflecting light
[i] High contrast behind the subject (the background may be focused)
[j] Under the following circumstances
- When using conversion lenses of effect filters
- When shooting a stationary subject using a tripod
- To save battery wear

Autofocusing does not function momentarily when:
- The setting of the shutter speed is changed.
- Back light is adjusted manually.
- Lighting conditions change quickly.
- Zooming is done from wide-range to telephoto.

This camcorder keeps in focus by referring to the picture contrast, which is weak in the above situations.

(H-2)



Focusing Manually

(H-2)

1 Slide open the AUTO LOCK cover.

2 Press FOCUS.
Make sure that the autofocus frame goes off in the viewfinder.

3 Turn the manual zoom lever fully to the telephoto position.

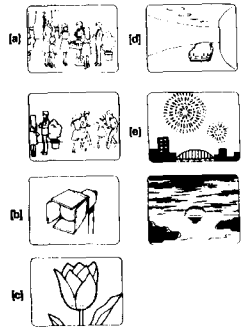
4 Turn the focus ring to achieve sharp focus.

5 Set the desired shot length using the manual zoom lever.

Some helpful hints
- When shooting in relatively dark places such as indoors, the depth of field in proper focus is very shallow. For best results, shoot at wide angles after focusing in telephoto.
- When shooting a scene with lots of movement in bright light, set the zoom lever to the wide-angle position and the focus ring to 2m.

Adjusting the White Balance

(I-1)

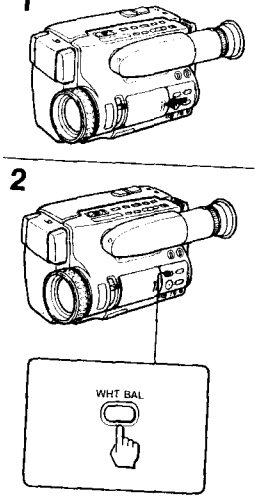


When you close the AUTO LOCK cover, the auto white balance function of this camcorder adjusts the picture to natural colors under most shooting conditions. However, in the conditions listed below, adjust the white balance manually.

[a] to **[e]** correspond to the illustrations **(I-1)**

	Conditions	Indication in the viewfinder
[a]	Lighting conditions change quickly	☆
[b]	Too bright, such as in photograph studios	
[c]	Monochromatic subject or background	HOLD
[d]	Under sodium lamp	☆
	Under mercury lamp	
	Under a color matching fluorescent lamp	
[e]	Recording: • a sunset/sunrise • after sunset • before sunrise e.g. neon signs, fireworks	✳

(I-2)



(I-3)

Color temperature (K)	Light source
10,000	Clear
8,000	
Blue	Slightly overcast
7,000	Cloudy, rainy
6,000	Fluorescent lamp (daylight)
5,000	
White	Direct sunlight
	Fluorescent lamp (daylight)
4,000	↑ hr. after/before sunrise/sunset
3,500	Fluorescent lamp (soft white)
	Studio lamp
	Halogen lamp
3,200	
3,000	
Yellow	
	Tungsten lamp
2,500	30 min. after/before sunrise/ sunset
Red	↓
2,000	Sunrise/sunset
	Candlelight

Adjusting the White Balance Manually

(I-2)

1 Slide open the AUTO LOCK cover.

2 Select the desired white balance mode by pressing WHT BAL.
Each time you press the button, the indication changes as follows.

No indication (auto) → HOLD → ✳ → ☆

What is the HOLD mode?
The HOLD mode allows you to film in natural color by keeping light sources at a certain color temperature. Initially the camcorder is in auto mode and is set to the appropriate white balance. When you set the camcorder to the HOLD mode, it will hold that temperature even if you record subjects with different light sources. You can record subject with natural colors without being affected by surroundings.

To set the HOLD mode

1 Close the AUTO LOCK cover.
The white balance will be set to the automatic mode.

2 Point at a white, flat object such as a white wall or paper for about 15 seconds.

3 Press WHT BAL to display the HOLD mark in the viewfinder.
When you change the battery pack or when the light source is changed, follow this procedure again.

Color Temperature and White Balance

(I-3)

The color temperature indicates a property of light and is measured in K (Kelvin). It increases as the light source gets bluer and decreases as the light source gets redder. It has no direct relationship with brightness.
The camcorder automatically adjusts the white balance within the range shown below.

Setting the Shutter Speed

(J-1)

When a fast-moving subject is recorded at normal shutter speed, it may not be seen clearly when played back in the pause mode (still picture). This can be improved by increasing the shutter speed. Six shutter speeds can be selected:1/60 (normal speed), 1/100, 1/250, 1/1000, 1/2000 or 1/4000 of a second. **(J-1)**

When recording at a high-speed shutter setting, record in a brighter place than usual.
Also, the depth of field in proper focus becomes shallow at a higher shutter speed. This is effective to record the main subject in sharp focus and the surroundings out of focus.

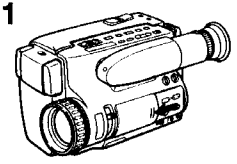
Recommended setting for your situation
Choose an appropriate shutter speed according to the situation, referring to the chart for examples.

Example use	Recommended shutter speed
• On clear days, recording a golf or tennis swing (To view the hit ball clearly in the still picture mode, set to 1/4000) • Recording skiers	1/4000 or 1/2000
• On overcast days, recording a moving merry-go-round or roller coaster • Recording outdoors from inside a vehicle (for stable shooting)	1/1000 or 1/250
• Instead of the ND2 filter (To reduce the exposure level to about a half) • Recording indoor sports (for stable shooting)	1/100

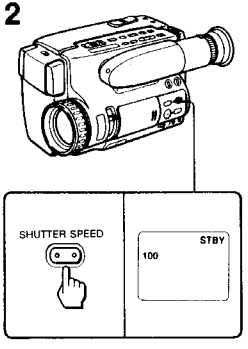
When playing back the picture recorded at certain speeds
Use 8mm video equipment with the clean still function to obtain a noiseless still picture.

(J-2)

1



2



Selecting the Shutter Speed

(J-2)

1 Slide open the AUTO LOCK cover.

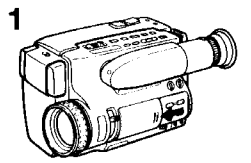
2 Press SHUTTER SPEED repeatedly until the desired shutter speed indication appears.
Each time you press the button, the indication changes as follows.

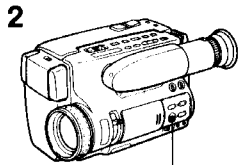
No indication (1/60) → 100 (1/100) → 250 (1/250)
↑ ↓
4000 (1/4000) ← 2000 (1/2000) ← 1000 (1/1000)

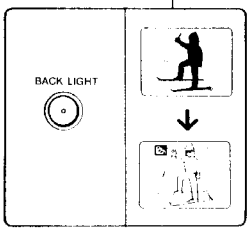
Notes
- When you select a shutter speed 1/250 or faster, record under sunlight or use a video light.
- When you record a TV screen with certain shutter speeds, the brightness of the recorded picture may vary.
- When you shoot a very bright subject at a faster shutter speed, a vertical light, belt-like line (smear) may appear on the screen.
- When you record at certain shutter speeds under a light discharges tube, such as a fluorescent lamp, sodium lamp, or mercury lamp, the brightness of the recorded picture may vary (causing the picture to flicker).

Shooting with Backlighting

(K-1)







In this camcorder, the exposure is automatically controlled. However, if the light source is behind the subject, use BACK LIGHT (K-1)

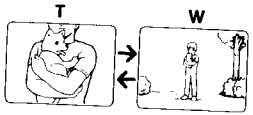
1 Slide open the AUTO LOCK cover.

2 Press BACK LIGHT.
The ⧅ indication appears in the viewfinder.

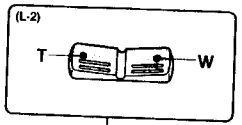
After shooting
Be sure to release this adjustment setting by pressing BACK LIGHT again.
(The ⧅ indication goes out.)
Otherwise, the recorded picture will be too bright.

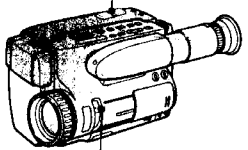
Zooming

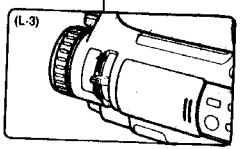
(L-1)



The size of the subject in the screen can be changed. Use "zoom-in" for dramatic close-ups. Use "zoom-out" for panoramic long shots. Also use zooming to focus manually or to decide the shooting angle. (L-1)







Power Zooming

— for smooth and constant zooming (L-2)

Press the T side of the power zoom button for telephoto (subject appears closer) and the W side for wide-angle (subject appears farther away).

Zooming Manually

— for creating a dramatic effect (L-3)

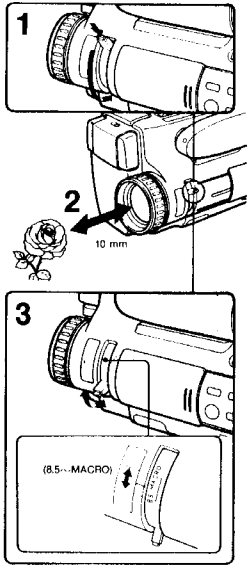
Turn the manual zoom lever upward for telephoto and downward for wide-angle.

Focal length of this camcorder
The focal length is 8.5 mm to 68 mm (1/3 to 2 3/4 inches). This means approximately 46 mm to 368 mm (1 13/16 to 14 1/2 inches) when converted into the focal length of a 35-mm camera.

For more zooming effect
Use an optional conversion lens VCL-0637 or VCL-1437.
If you use a 46 mm conversion lens, attach it using the supplied step-up ring. Auto focus, however will not function in that case. For details, consult your Sony dealer.

When shooting with auto focusing
When you set the zoom lever to the wide angle position, the focus ring will be fixed around the 2 m position and may not exactly match the actual object-to-camera distance.

(M-1)



Close-Up (Macro)

Even tiny subjects, such as flowers, insects, and photographs, can literally fill the screen. **(M-1)**

1 **Turn the zoom lever to the MACRO position, pressing the green macro set button.**

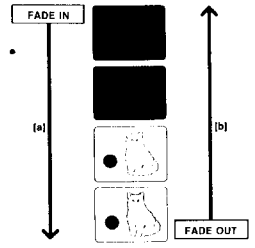
2 **Bring the camcorder as close as necessary to obtain the desired size of image.**
The subject can be as close as a minimum of 10 mm (7/16 in.) from the lens surface.

3 **Turn the zoom lever within the MACRO range to focus sharply.**

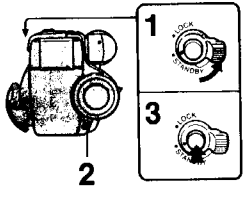
In the MACRO range, auto-focusing does not function.

Notes
- When shooting in macro, the depth of field is very shallow. So pay attention to focusing. To keep the subject in focus, use a tripod.
- If the subject is closer than 10 mm (7/16 in.), it cannot be brought into focus.

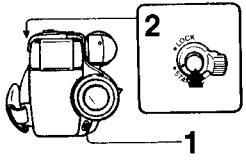
(N-1)



(N-2)



(N-3)



Fade-in and Fade-out

When fading-in, the picture will gradually appear from a black screen. The sound will also gradually increase.
When fading-out, the picture will gradually disappear to a black screen. The sound will also gradually decrease.
This function will give your recording a professional appearance. **(N-1)**

To Fade-in

(N-2)

1 **Slide STANDBY up to set the camcorder in the standby mode.**

2 **Press FADER.**
The "FADER" indication appears in the viewfinder.

3 **Press START/STOP.**
Fade-in is performed and then recording will start.

To Fade-out

(N-3)

1 **While recording, press FADER.**
The "FADER" indication appears in the viewfinder.

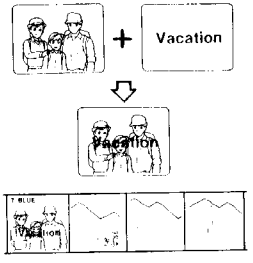
2 **Press START/STOP to stop the recording.**
Fade-out is performed and then recording stops.

To cancel the fade-in/fade-out function before it is performed
Press FADER again before pressing START/STOP.

If you want to use the fade-in/fade-out function repeatedly
Start from step 1 each time.

Recording a Title

(O-1)



You can superimpose your own hand-lettered message or illustration over the picture during recording. **(O-1)**

- One title can be stored
- The color of the title can be selected from 8 colors.

To make a desired title card, use a plain, white card and write a title using a dark color and thick lines.

Before recording, store the title or illustration.

Storing a Title

(O-2)

Make sure that the lithium battery is installed.

1 While pressing the green button, set POWER to CAMERA.

2 Slide STANDBY up to set the camcorder in the standby mode.

3 Point the camcorder to the title card and adjust the focus.
To focus the subject, use the close-up function if necessary.

4 Press MEMORY to store the title.

5 Press COLOR/MODE and select the title color.
Each time you press the button the indication changes as follows.

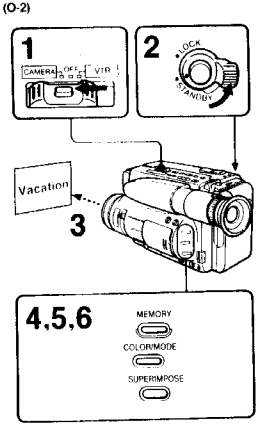
WHT (white) → BLUE → GRN (green) → CYAN
↑ ↓
BLK (black) ← YEL (yellow) ← VIO (violet) ← RED

6 Press SUPERIMPOSE to turn off the title.

To check the title
Press SUPERIMPOSE in the standby mode. To turn off the title, press the button again.

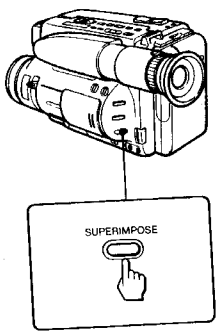
About memory back up
The camcorder uses a lithium battery (located on the bottom of the unit) to keep the title in memory. On lithium battery life, see page 20.

(O-2)



Superimposing the Title on a Picture

(O-3)



1 During recording, press SUPERIMPOSE at the point from which you want to insert the title.
The title is displayed. During recording, the title is recorded.

2 Wait for a while and at the point you want to turn off the title, press SUPERIMPOSE again.
The title goes out.

When recording the title at the beginning
We recommend the following method:

1 Set the camcorder in the standby mode.

2 Press SUPERIMPOSE.

3 Start recording with the title displayed in the viewfinder.

4 Wait for a while and at the point you want to turn off the title, press SUPERIMPOSE again.

About the color indication
- The color indication in the viewfinder is not recorded.
- You can change the title color by pressing COLOR/MODE even after displaying the title.

(O-4)

(O-5)

(O-6)

(O-7)

Various Display Modes of the Title

Display mode	Indication in the viewfinder
Scrolling up the title (O-4) The title scrolls up.	↑
Reversing the title with the picture (O-5)	
Scrolling up the reversed title (O-6)	↑
Normal display mode	No indication

Selecting the display mode
Before displaying the title, press COLOR/MODE until the indication of the mode you want appears. **(O-7)**

After selecting the mode
Follow the procedure on page 45 to superimpose the title on the picture in that mode.

(O-8)

Function of the COLOR/MODE button

This button has a double function: one is to select the title color and the other is to select the title display mode. Its function depends on whether the title is displayed or not. **(O-8)**

To select the color

1 **Press SUPERIMPOSE to display the title.**

2 **Press COLOR/MODE.**
Each time you press the button, the color indication changes as follows.

WHT (white) → BLUE → GRN (green) → CYAN
↑ ↓
BLK (black) ← YEL (yellow) ← VIO (violet) ← RED

To select the mode

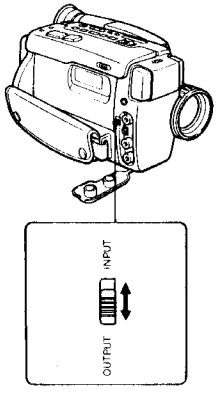
1 **If the title is displayed, press SUPERIMPOSE so that the title disappears.**

2 **Press COLOR/MODE.**
Each time you press the button, the mode indication changs as follows.

No indication (no title mode) → ↑ → ■ → ■↑
↑ ←

↑: Title scroll up mode
■: Title reverse mode
■↑: Title reverse and scroll up mode

(P.1)



Connection for Playback

To view the playback picture on the TV screen, the camcorder and the TV and /or VCR must be connected properly. Check the following connecting examples and go to the appropriate section to make the connections required. We recommend use of the AC power adaptor as a power source.

Types of Connections

Type 1: Connecting the camcorder to a TV with video/audio input jacks.

Type 2: Connecting the camcorder to a TV without video/audio input jacks.

Type 3: Connecting the camcorder to a TV via a VCR that has an input selector.

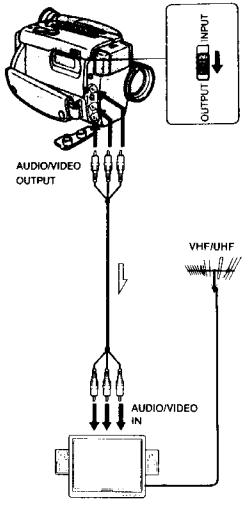
About the AUDIO/VIDEO Jacks

(P.1)

The AUDIO/VIDEO jacks work as both input jacks and output jacks. Set the INPUT/OUTPUT selector switch as follows.

to OUTPUT position	to view playback tape
to INPUT position	to record from another VCR or a TV

(P.2)



: Signal flow

Type 1: Connecting to a TV with Video/Audio Input Jacks

(P.2)

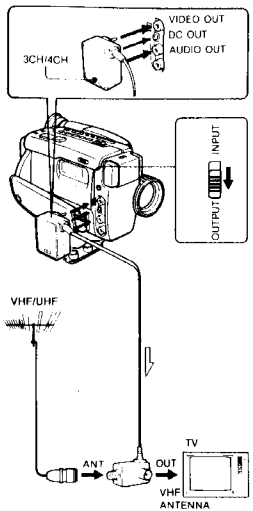
1 Connect the camcorder and the TV using the supplied AV connecting cable.

- If your TV is a monaural type, connect only the white plug for audio both on the camcorder and the TV. Do not use the red plugs.
- If your TV is a stereo type, the sound will be in stereo and when your TV is a monaural type, the sound will be in monaural.

2 Set the INPUT/OUTPUT selector on the camcorder to OUTPUT.

3 Set the TV/VTR selector on the TV to VTR.

(P-3)



: Signal flow

Connection for Playback

Type 2: Connecting to a TV without Video/Audio Input Jacks

(P-3)

Step 1

Connecting the camcorder, the RFU adaptor (RFU-90 UC, supplied), and the TV.

1 **Connect the RFU adaptor to the camcorder.**

2 **Connect the VHF/UHF antenna to the RFU adaptor.**

3 **Connect the RFU adaptor to the TV.**

4 **Set the INPUT/OUTPUT selector on the camcorder to OUTPUT.**

Step 2

Selection of the TV channel to monitor the camcorder playback.

1 **Set the RF unit selector on the RFU adaptor to either channel 3 or 4, whichever is not active in your area.**

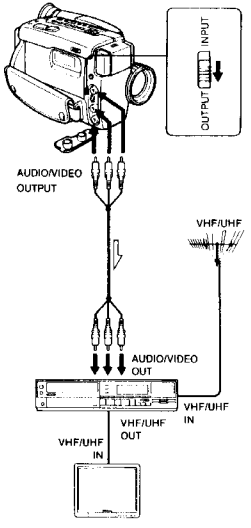
2 **Select the same channel on the TV.**

Step 3

Whenever playing back a tape, be sure to set the TV to the channel that you have selected in step 2.

Note
With this connection, the sound will be in monaural.

(P-4)



: Signal flow

Type 3: Connection to a TV via a VCR with an Input Selector

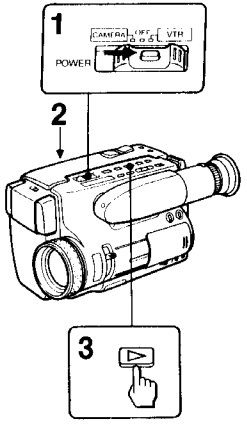
(P-4)

1 **Connect the camcorder to the VCR using the supplied AV connecting cable.**
- If your VCR is a monaural type, connect only the white plug for audio both on the camcorder and the TV. Do not use the red plugs.
- You will have stereo sound if your TV and VTR are stereo, however if one is monaural the sound will be monaural.

2 **Set the INPUT/OUTPUT selector on the camcorder to OUTPUT.**

3 **Set the input selector on the VCR to LINE and set the TV/VTR selector on the TV to VTR.**

(Q-1)



Playing Back a Tape

Turn on the TV, and select the channel for viewing a playback picture (set the TV/VTR selector to VTR).

(Q-1)

1 While pressing the green button, set the POWER switch to VTR.

2 Insert a tape.

3 Press ▷.
Playback starts.

To view a still picture
Press ⏸ during playback.
To resume playback, press ⏸ or ▷ again.

To stop playback
Press □.

To rewind the tape
Press ◀◀.

To advance the tape rapidly
Press ▶▶.

Note
Streaks will appear and sound will be muted in the still picture mode.

Monitoring a High-Speed Picture

During playback—Picture search

1 In the playback mode, press ◀◀ or ▶▶.
The picture will be monitored at high speed as long as ◀◀ or ▶▶ is kept pressed.

2 Release ◀◀ or ▶▶ at the desired point.
Normal playback will resume.

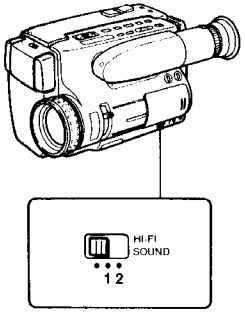
During fast-forward or rewind – Skip scan

1 In the fast-forward or rewind mode, press ◀◀ or ▶▶.
The picture is monitored as long as ◀◀ or ▶▶ is kept pressed.

2 Release ◀◀ or ▶▶ to resume the normal fast-forward or rewind mode.

Notes
- If you move the position of POWER during playback, the tape will stop. When you move POWER to CAMERA in the playback pause mode, however, the camcorder will enter recording pause mode.
- When the pause mode lasts for 5 minutes or more, the camcorder will automatically enter the stop mode.

(Q-2)



Selecting the Monitor Sound

(Q-2)

The playback sound can be selected with the HI-FI SOUND switch.

When playing back a HI-Fi stereo sound recorded tape
Set the switch to "Green position."

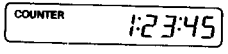
When playing back an AFM monaural sound recorded tape
Set the switch to "Green position." Monaural sound comes from the both audio jacks.

When playing back a dual sound recorded tape
Set the switch to " 1 " or " 2 ."

Using the Tape Counter

During recording or playback, the digits on the counter indicate the actual tape position. (R-1)

(R-1)



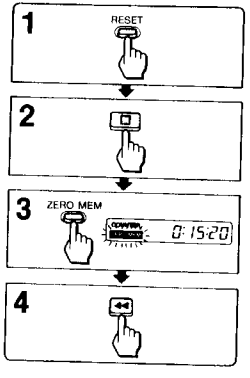
To Index the Whole Tape

Press RESET at the beginning of the tape so that the counter shows "0:00:00."
Write down the counter reading at a particular point so that you can easily find that point later by referring to the tape counter.

To Return to a Pre-registered Point During Playback

(R-2)

(R-2)



1 **During playback, press RESET at the point you later want to locate.**
The counter will show "0:00:00."

2 **Press □ when the playback has finished, as usual.**

3 **Press ZERO MEM.**
The "ZERO MEM" indicator blinks in the display window.

4 **Press ◀◀ or ▶▶.**
The tape rewinds or advances and stops automatically when the counter reaches approximately zero.

To return to a pre-registered point during recording

1 **During recording, press RESET at the point you later want to locate.**

2 **After recording, press START/STOP to enter the standby mode.**

3 **Slide down STANDBY.**

4 **While pressing the green button, set the POWER switch to VTR.**

5 **Press ZERO MEM.**

6 **Press ◀◀.**

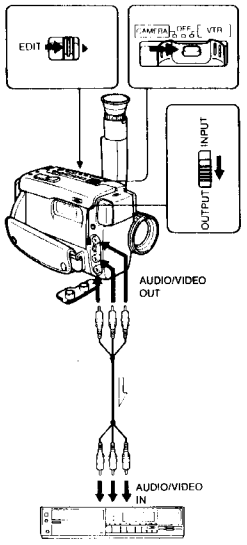
7 **After the tape stops, press ▷ .**

Notes on the tape counter and ZERO MEM

- The counter reading and the point on the tape may not correspond exactly. Use the counter as a guide. There will be a time lag of several seconds especially when you repeat fast-forward running/rewinding and play back a tape recorded in LP and SP modes mixed.
- Be sure to press the ZERO MEM after you stop the tape. It does not function during recording or playback.
- The ZERO MEM mode is cancelled automatically once the tape is rewound or sent forward to the point you pre-registerd.

Recording onto Another VCR

(S-1)



: Signal flow

You can create your own video program by editing with any other 8 8 mm, Ⅱ Betamax or VHS VHS VCR.

Before You Begin

- Make connections using the supplied audio/video connecting cable. **(S-1)**
- Set the input selector of the VCR to LINE, if available.

Operation

1 **Insert a tape to be recorded on into the recording VCR.**

2 **Move EDIT on the camcorder in the direction of the arrow. (EDIT ON)**

3 **Set INPUT/OUTPUT to OUTPUT.**

4 **Set POWER of the camcorder to VTR and insert your recorded tape.**

5 **Playback the tape on the camcorder and locate the point where you want to start editing and set the camcorder to the playback pause mode.**

6 **On the recording VCR, locate the recording start point and set the VCR to the recording pause mode.**

7 **Press ⏸ on both units simultaneously to start editing.**

To stop editing momentarily
Press ⏸ on the recording VCR.

To edit more scenes
Repeat steps 5 to 7.

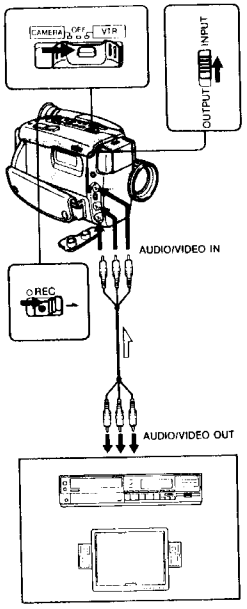
To stop editing
Press ■ on both units.

Use of the EDIT switch
When you set EDIT to the direction of the arrow (EDIT ON), picture deterioration resulting from editing can be kept to the minimum.

Notes
- Avoid using the edited tape for multiple generations of editing.
- After editing, move EDIT in the opposite direction of the arrow (EDIT OFF).

Recording from Another VCR or a TV

(T-1)



: Signal flow

You can record a tape from another VCR or a TV program from the TV equipped with audio/video outputs. **(T-1)**

Before You Begin

- Disconnect the RFU adaptor from the camcorder if it is connected.
- Make connections using the supplied audio/video connecting cable.
- Read the instruction manual of the other equipment to be connected.

If your VCR or TV is a monaural type, connect only the white plug for audio both on the camcorder and the VCR or TV. Do not use the red plugs.

Operation

1 **Turn on the TV or VCR.**

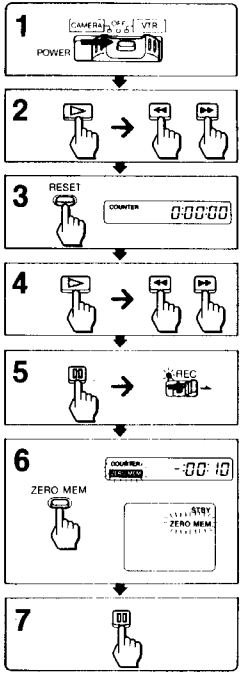
2 **Select the TV program or play back the tape to be recorded.**

3 **Set INPUT/OUTPUT to INPUT.**

4 **While pressing the green button, set the POWER on the camcorder to VTR.**

5 **Insert a tape and slide ● REC.**
Recording starts.
You can monitor the picture being recorded in the viewfinder screen.

(U-1)



Insert Recording

You can insert a new scene from a VCR or the TV onto your originally recorded tape. **(U-1)**

Before You Begin

- Connection is the same as in "Recording from a TV or Another VCR."
- Set the VCR in the playback pause mode at the beginning of the desired scene.

Operation

1 **Set POWER of the camcorder to VTR and display the counter in the display window.**

2 **Locate the point where the insert should end by pressing ◀◀ or ▶▶ during playback.**
The viewfinder screen shows a high-speed playback picture.

3 **At the end point, press RESET.**
The counter is reset to "0:00:00."

4 **Locate the point where the insert should start.**

5 **At the start point, set the camcorder into recording pause mode.**

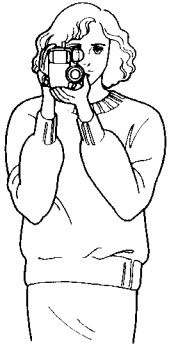
6 **Press ZERO MEM.**
The end point of the insert is stored in memory.

7 **Press ⏺ on both units to start insert recording.**
You can monitor the picture to be inserted in the viewfinder screen.

The insert recording will stop automatically near the zero point on the counter.

To change the end point
Press ZERO MEM so that the ZERO MEMO indicator disappears, and repeat from step 2.

(V-1)



(V-2)

Hints for Better Shooting

Shooting Stable Pictures

Assume a good posture for shooting **(V-1)**
For hand-held shots, it is important to hold the camcorder properly.

- Hold the camcorder firmly and secure it with the grip strap so that you can easily manipulate the camcorder with your thumb.
- Place your right elbow against your side.
- Place your left hand under the camcorder to support it. When adjusting the focus manually, make sure the camcorder does not move.
- Place your eye firmly against the viewfinder eyecup.

Use a tripod
If you have a tripod for still camera, it can also be used with the camcorder. If a tripod is not available, try placing the camcorder on a table top or any other flat surface of suitable height.

Keep the horizontal plane level (V-2)
The horizontal plane can be easily determined by using the viewfinder frame as a reference.

Planning Beforehand

If you are going to edit the tape after recording
Shoot the scene a little longer to make the editing easier.

If you are not going to edit the tape after recording
First record a title and then use the START/STOP button to make a smooth recording.

Hints for Better Shooting

Lighting

Shoot with the sun behind you
When the light source is behind the subject, or in the following situations, the subject will look dark and the background will look light in the recording.

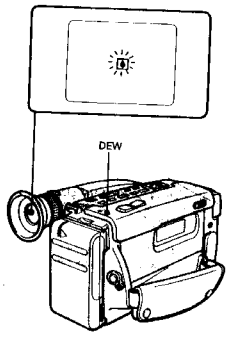
- The subject is indoors and there is a window behind the subject.
- Bright source such as fluorescent or incandescent lamps are included in the scene.
- You are shooting a person wearing white or shiny clothes in front of a white background. In this case, the face will look dark in the recording.

Use video light in the dark
To get the best colors, a sufficient light level must be maintained. Photography lamps or halogen lamps are recommended. For best result, use of Sony video lights are recommended because of their weight and low heat output levels. When using a video light, attach it to this camcorder with a video light attachment (not supplied.)
High heat from light can warp the casing. Do not let light shine on the camcorder. Be especially careful when you are using a video light attachment.
Do not place your face or hair too close to the light during low-position shooting (page 26). For detailed instructions on proper use of light, read its instruction manual.

Brightness levels
Using the following chart as a reference, take a few minutes to familiarize yourself with brightness levels to improve your recording technique.

	Unit: lux	ND filter
Snow-covered mountains Snow fields Sandy beach, clear day in summer		recommended
Clear day, mid-day (100,000lux)	100,000	
Clear day, mid-afternoon (35,000)		
Overcast day, mid-day (32,000)	10,000	
Overcast day, one hour after sunrise (2,000)		
Office lit by fluorescent lamps, near window (1,000)	1,000	
Clear day, one hour before sunset (1,000)		normal recording
Department store counter (500-700)		
Station wicket (650)		
Office lit by fluorescent lamps (400-500)	500	
Room lit by two 30W fluorescent lamps (300)	300	
Subway station platform (300)		
Arcade at night (150-200)	200	
Theater lobby (15-35)	100	video light recommended
Candle light (10-15)	10	

(W·1)



(W·2)

Notes and Precautions

Notes on Moisture Condensation

If the camcorder is brought directly from a cold place to a warm place, moisture may condense inside the camcorder, on the surface of the tape, or on the lens. In this condition, the tape may stick to the head drum and be damaged or the camcorder may not operate correctly. To prevent possible damage under these circumstances, the camcorder is furnished with moisture sensor. However, take the following precautions.

If moisture condenses inside the unit (W·1)

Moisture is present inside the camcorder when the 💧 indication in the viewfinder blinks. ⏏ indication also blinks when the cassette is inserted. In this case, no function except for tape ejection will work.
Eject the tape, turn off the camcorder, and leave it with the cassette holder open for about 1 hour.
The camcorder can be used again if the 💧 indication does not appear when the power is turned on again.

If moisture condenses on the surface of the tape (W·2)

If moisture is present on the surface of the tape when the tape is inserted and a tape transport button (▷, ▶▶, etc.) is pressed, the ⏏ indication blinks inside the viewfinder. In such case, no function except for tape ejection will work.
Eject the tape and let it sit for about 1 hour. The tape can be used again if the ⏏ indication does not appear when the tape is inserted and a tape transport button is pressed.

If moisture condenses on the lens
No indications will appear, but the picture becomes dim. Turn off the power and leave the camcorder unused for about 1 hour.

(W-3)

Notes on Video Head Cleaning

To ensure clear picture, clean the video heads periodically.
When playback pictures are noisy or hardly visible, the video heads may be contaminated. **(W-3)**

[a] Slight contamination
[b] Critical contamination
In such cases,

1 **Clean the video heads with the Sony V8-25CLH cleaning cassette (not supplied), referring to its instructions.**

2 **After cleaning, check if the picture is clear by recording or playing back with an ordinary tape.**

3 **If the picture is still noisy, repeat cleaning. (Do not repeat cleaning more than 5 times.)**

Caution
Do not use a commercially available wet-type cleaning cassette. It may damage the video heads.

Note
If the V8-25CLH cleaning cassette is not available in your area, consult your Sony service facility.

Precautions

On operation
- Operate the camcorder on 6.0 V (battery pack), 7.5 V (AC power adaptor), 9.0 V (alkaline batteries).
- For DC or AC operation, use the accessories recommended in this manual.
- Should any solid object or liquid fall into the casing, unplug the camcorder and leave it checked by qualified personnel before operating it any further.
- Do not hold the camcorder by the viewfinder.
- Avoid rough handling or mechanical shock. Be particularly careful of the lens.
- Keep the lens cap on the lens when not using the camera.
- Do not wrap the camcorder and operate it because heat may built up internally.
- Keep the camcorder away from strong magnetic field or mechanical vibration.
- Do not put the camcorder on the sand.

On care
- When the unit will not be used for a long time, disconnect the power source and remove the tape. Periodically turn on the power, operate the camera section and player section, and play back a tape for about 3 minutes.
- Clean the lens with a soft brush to remove dust. If there are fingerprints on it, wipe them off with a soft cloth.

Clean the camcorder body with a dry, soft cloth, or a soft cloth lightly moistened with a mild detergent solution. Do not use any type of solvent which may damage the finish.

Note on copyright
Television programs, films, video tapes, and other materials may be copyrighted. Unauthorized recording of such materials may be contrary to the provision of the copyright laws.

Using Your Camcorder Abroad

Each country has its own electricity system and TV color system. Before using your camcorder abroad, check the following points.

Power Sources

You can use your camcorder in any country with the supplied AC power adaptor within 100 V to 240 V AC, 50/60Hz.

Difference in Color Systems

You can view the playback picture in the viewfinder. However, if you want to view the playback picture on a TV, it must be a NTSC system-based TV. Check the following list. (in alphabetical order)

NTSC system countries
Bahama Islands, Bolivia, Canada, Central America, Chile, Colombia, Ecuador, Jamaica, Japan, Korea, Mexico, Peru, Surinam, Taiwan, The Philippines, U.S.A., Venezuela, etc.

PAL system countries
Argentina, Australia, Austria, Belgium, Brazil, China, Denmark, Finland, Great Britain, Holland, Hong Kong, Italy, Kuwait, New Zealand, Norway, Paraguay, Portugal, Singapore, Spain, Sweden, Switzerland, Thailand, Urguay, West Germany, etc.

SECAM system countries
Bulgaria, France, Guiana, Hungary, Iran, Iraq, Monaco, Poland, Soviet Union, etc.

[redacted]

Video recording system
Four Rotary heads, Helical scanning FM system
Audio recording system
Four Rotary heads, Helical scanning FM system
Video signal
NTSC color, EIA standards
Usable cassette
8 mm video format cassette
Tape speed
SP mode: Approx. 1.43 cm (1/16 inch)/sec
LP mode: Approx. 0.72 cm (1/32 inch)/sec
(playback only)
Recording time
SP mode: 2 hours (P6-120)
Playback time
SP mode: 2 hours (P6-120)
LP mode: 4 hours (P6-120)
Fast forward/rewind time
Approx. 8 minutes (P6-120)
Image device
CCD (Charge Coupled Device)
Viewfinder
Electronic viewfinder (black and white)
Lens
Combined 8× power zoom lens
f = 8.5 – 68 mm (11/32 to 2 3/4 inches),
F 2.0 with macro filter diameter 37 mm (1 1/2 inches)
Auto focus system
TTL
Color temperature
Automatic, HOLD, ☼ (indoor) 3200K, ☀ (outdoor) 5,800K
Minimum illumination
4 lux (F 2.0)
Illumination range
4 lux – 100,000 lux (0.4 – 9,290 footcandles)
Recommended illumination
More than 100 lux (9.3 footcandles)
Aperture correction
Automatic

Input and output connector

Video input/output
Phono jack, 1 Vp-p, 75 ohms unbalanced sync negative
Audio input/output
Phono jack
Input: – 7.5 dBs, input impedance more than 47 kilohms
Output: – 7.5 dBs, (at output impedance 47 kilohms) impedance less than 2.2 kilohms
DC OUT
Special minijack, DC 5V
Headphones jack
Stereo minijack
Remote jack
Stereo mini-minijack
MIC jack
Stereo Minijack, – 66 dBs, low inpedance with 2.5 – 3 V DC output, impedance 6.8 kilohms

[redacted]

Power requirements
6.8 V battery pack(s)
7.5 V DC power adaptor
8.0 V [illegible]
Power consumption
5.3 W (camera recording) including the viewfinder
Installation
Vertically, Horizontally
Operating temperature
0°C to 40°C (32° F to 104° F)
Storage temperature
-20°C to +60°C (14° F to +140° F)
Dimensions
Approx. 109 × 106 × 183 mm (w/h/d) (4 3/8 × 4 1/4 × 7 1/4)
Weight
Approx. 780 g (1 lb 12 oz) excluding the battery and cassette
Microphone
Electret condenser microphone, stereo type
Supplied accessories
See page 5.

Design and specifications are subject to change without notice.

Trouble Check

If any difficulty should arise during operation, go through the following table. Should the difficulty persist, unplug the unit and contact your Sony dealer or local authorized facility.

	Symptom	Cause	Procedure
Power	The power will not turn on.	• The battery is not attached. • The battery is exhausted. • The AC power adaptor is not connected to a wall outlet.	• Attach the battery. • Use a charged battery. • Connect the adaptor to a wall outlet.
	The power turns off.	• While being operated in the CAMERA mode, the recorder has been in the pause mode for more than 5 minutes. • The battery is exhausted.	• Turn STANDBY to LOCK once and turn it to STANDBY again. • Use a charged battery.
	The battery pack is quickly discharged.	• The ambient temperature is too low. • The battery pack has not been charged fully.	• Charge the battery pack again.
Operation	START/STOP does not operate.	• The tape is affixed to the drum. • The tape is at its end. • POWER is set to VTR. • The tab on the cassette is out (red).	• Remove the cassette with the cassette eject button. • Rewind the tape or use a new one. • Set it to CAMERA. • Use a new cassette or slide the tab.
	The cassette cannot be removed from the compartment.	The battery is exhausted.	Use the charged battery or the AC power adaptor.
	No function except for cassette ejection works.	Moisture condensation has occurred. (See page 61.)	Remove the cassette and do not use the unit for about an hour.
	The tape does not move when a tape transport button is pressed.	• POWER is set to CAMERA or OFF. • The tape is at its end.	• Set it to VTR. • Rewind the tape or use a new one.
	The auto focusing function does not work.	Shooting condition were not suitable for auto focusing operation. (See page 34.) The AUTO LOCK cover is not closed perfectly.	Open the AUTO LOCK cover and press FOCUS to adjust the focus manually.
Picture	The image on the viewfinder screen is not clear.	The viewfinder lens is not adjusted.	Adjust the viewfinder lens.
	A vertical band appears when a subject such as lights or candle flame is shot against a dark background.	The contrast between the subject and background is too high; the camcorder is not malfunctioning.	—
	The color of the playback is strange.	Shooting conditions were not suitable for white balance operation when it was recorded. (See page 36.)	When recording, set the white balance adjustment (auto or manual) according to the light condition. (See page 36.)
	The playback picture is not clear.	• EDIT is set in the direction of the arrow. • The channel for the VCR is not adjusted on the TV.	• Set EDIT in the reverse direction of the arrow. • Adjust the TV.
	The picture is noisy.	The video heads may be contaminated.	Clean the heads using the Sony V8-25CLH video head cleaning cassette. (See page 62.) If the V8-25CLH cleaning cassette is not available in your area, have the heads cleaned at the nearest Sony service facility.

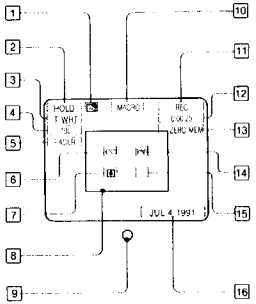
	Symptom	Cause	Procedure
Sound	No sound or only a low sound is heard when playing back a tape.	The stereo tape is played back with the camcorder set to "HI FI SOUND [1] or [2]."	Set the switch to "Green position."
	Excessive high-pitched sound is heard.	The picture has been recorded with BUILT-IN MIC set to "WIND."	When there is no wind, set the switch to the green position.
Others	• Recording on another tape is impossible. • Recording a TV program or recording from another tape is impossible.	• The INPUT/OUTPUT selector switch is set to INPUT. • The INPUT/OUTPUT selector switch is set to OUTPUT.	• Set to OUTPUT. • Set to INPUT.
	There is dust inside the viewfinder.	—	Pull out the viewfinder and clean the viewfinder screen cover or viewfinder lens. (See page 12.)

[ ] fast blinking [ ] slow blinking

Display in the viewfinder screen and caution lamp	Cause	Corrective action
[ ] and Battery lamp	The battery is weak.	Prepare a charged one.
[ ] and Battery lamp	The battery is used up.	Use a charged battery.
[ ] and Battery lamp	The tape is near its end.	Prepare a new one.
[ ], ⏏ and battery lamp	The tape is at its end.	Use a new tape.
[ ]	No tape is inserted.	Insert a tape.
[ ] and ⏏	The tab on the tape is out (red).	Slide the tab back or use a new tape.
[ ], ⏏ and DEW lamp	Moisture condensation has occurred.	Remove the tape and do not operate the camcorder for about 1 hour.
⏏ and DEW lamp	Moisture condensed on the tape.	Remove the tape and do not operate the camcorder for about 1 hour.
⊗ and Caution lamp	The gap of the head is clogged.	Clean the head using the Sony V8-25CLH cleaning tape.
⏏ and Caution lamp	Other trouble may occur.	Turn off the camcorder and remove the battery. Then attach the battery again. If the lamp still blinks, consult your nearest Sony dealer.

Display in the viewfinder screen	Display window	Cause	Corrective action
"AM 12:00:00" blinks for 5 seconds after setting POWER to CAMERA.	"AM 12:00:00" or bar indication blinks.	The lithium battery is not installed. The lithium battery is exhausted.	Install a battery or new battery.
The current time blinks for 5 seconds after setting POWER to CAMERA.	The current time or date or counter number blinks.	The lithium battery is weak.	Install a new battery.

(X-1)



Inside the Viewfinder

(X-1)

1 BACK LIGHT is pressed.

2 White balance mode (☀ / ☁ /HOLD)

3 Title mode

4 Shutter speed

5 FADER is pressed.

6 "Replace battery."

7 Moisture condensation.

8 Auto focus adjusting range
Goes out during manual focusing

9 Shows up during recording.
When blinking: "Replace battery."

10 In the MACRO range

11 Tape transport and camera recording mode

12 Tape counter

13 ZERO MEM is pressed.

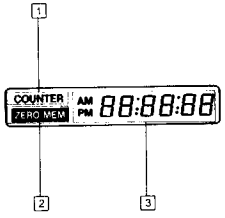
14 "Exchange tape."

15 "Clean video heads." or other caution (⊗, ⏏)

16 Date or time

[illegible] inside the Viewfinder and the [illegible]

(X-2)



Display window

(X-2)

1 Tape counter

2 ZERO MEM is pressed.

3 Date or time/tape counter